11-6760-213-12

TM 11-6760-213-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOL LISTS

FLASH UNIT, PHOTOGRAPHIC REPEATING LM-33(1)

This copy is a reprint which includes current pages from Change 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY
APRIL 1967

TAGO 7392A

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WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working near the 700-volt power supply and lamphead circuits.

CAUSTIC LIQUID IS USED IN THIS EQUIPMENT WHEN THE BATTERY IS INSTALLED

The battery electrolyte contains caustic soda (lye) which may cause skin irritation or allergy.

Do not allow electrolyte to come in contact with the skin or eyes. If contact occurs, flush immediately with water, then wash thoroughly. In case of eye contact, get prompt medical attention.

DON'T TAKE CHANCES!

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HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *15 July 1974*

Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists FLASH UNIT, PHOTOGRAPHIC REPEATING LM-33(1)

TM 11-6760-213-12, 13 April 1967, is changed as follows:

1. The title is changed to read as shown above.
2. A vertical bar appears opposite changed material.
3. Remove and insert pages as indicated in the page list below:

Remove Pages	*Insert Pages*
i and ii	i and ii
1-1 through 1-5	1-1 through 1-6
4-1 and 4-2	4-1 and 4-2
B-1 through B-3	B-1 and B-2

4. File this change sheet in the front of the manual for reference purposes.

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

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The Adjutant General

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ATAD (10)
USA Dep (2)
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ATS (1)
MAAG (1)
WRAMC (1)
USARMIS (1)
USAERDAA (1)
USAERDAW (1)
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Ft Richardson (ECOM Ofc) (2)
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11-500 (AA-AC)
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ARNG: State AG (3).
USAR: None.
For explanation of abbreviations used, see AR 310-50.

TECHNICAL MANUAL
No. 11-6760-213-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *13 April 1967*

Organizational Maintenance Manual Including Repair Parts and Special Tool Lists
FLASH UNIT, PHOTOGRAPHIC REPEATING LM-33(1)

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*This manual supersedes TM 11-6760-213-10, 28 April 1961, including C 2, 19 June 1963, and C 3, 15 January 1965; TM 11-6760-213-20, 17 May 1961, including C 1, 19 June 1963; and TM 11-6760-213-20P, 15 September 1961.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Flash Unit, Photographic Repeating LM-33(1) and covers its service upon receipt, operating instructions, and operator's and organizational maintenance. It includes operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available to operator and organizational maintenance personnel.

b. The Basic Issue Items List (BIIL) and Items Troop Installed or Authorized List (ITIAL) appears in appendix B; the maintenance allocation chart (MAC) appears in appendix C; the organizational maintenance repair parts and special tool lists (RPSTL) appear in appendix D.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58/NAVSUP PUB 387/AFR 71-4/MCO P4030.29, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33/AFM 75-18/MCO P4610.19A, and DSAR 4500.15.

1-3.1. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-S, Fort Monmouth, NJ 07703.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

Flash Unit, Photographic Repeating LM-33(1) is a portable, electronic flash unit that provides a flash of intense light of short duration for use as a light source in flash photography. It is intended for field use with Camera, Still Picture KE-12(L), part of Camera Set, Still Picture KS-4A (1); it may be used with other cameras that have type X (zero delay) synchronization. The LM-33(L) may be used, also, for nonsynchronized (open flash) photography.

1-5. Technical Characteristics

Power requirements:	
Ac operation	115-volt (±10 volts), or 230-volt (±20 volts), 50- to 60-cycle-per-second, single-phase alternating current.
Battery operation	6-volt direct current furnished by a storage battery (not supplied).

Power storage capacity	100 watt-seconds (joules).
Recycle time	8 seconds to 83 percent of peak voltage.
Number of flashes:	
Battery operation (fully charged battery)	125 minimum at FULL power.
Ac operation	Unlimited.
Battery charging rate	500 milliamperes (average).
Synchronization	X-type (zero delay).
Flash tube:	
Type	Spiral element, Xenon gas filled (General Electric type FT218 or equal).
Life expectancy	10,000 flashes (approx).
Color temperature	6,000° Kelvin (daylight balance).
Light output:	
FULL power	4,800 beam candlepower seconds with 50° coverage (BCPS/50°) (300 lumen-seconds per square foot at 4 feet with 50° coverage).
HALF power	2,400 BCPS/50° (150 lumen-seconds per square foot at 4 feet with 50° coverage).
Battery (not supplied):	
Quantity	One.
Type	Five-cell, nickel-cadmium storage (wet).
Rating	6 volts, 4.7 ampere-hours.
Dimensions	4¼ inches high by 3 5/16 inches wide by 2 7/32 inches deep.
Charging time	Approximately 10 hours (completely discharged battery).
Life expectancy	Indefinite.
Environmental conditions:	
Operation:	
Temperature	0° F. to 125° F. (-17.5° C. to 51° C.).
Relative humidity	95 percent maximum.
Elevation	10,000 feet maximum.
Storage:	
Temperature	50° F. to +150° F. (-45° C. to 66° C.). (At low extreme, 24 hours max; at high extreme, 4 hours max. Storage at extreme temperatures without battery.)
Relative humidity	95 percent maximum.
Elevation	50,000 feet maximum.

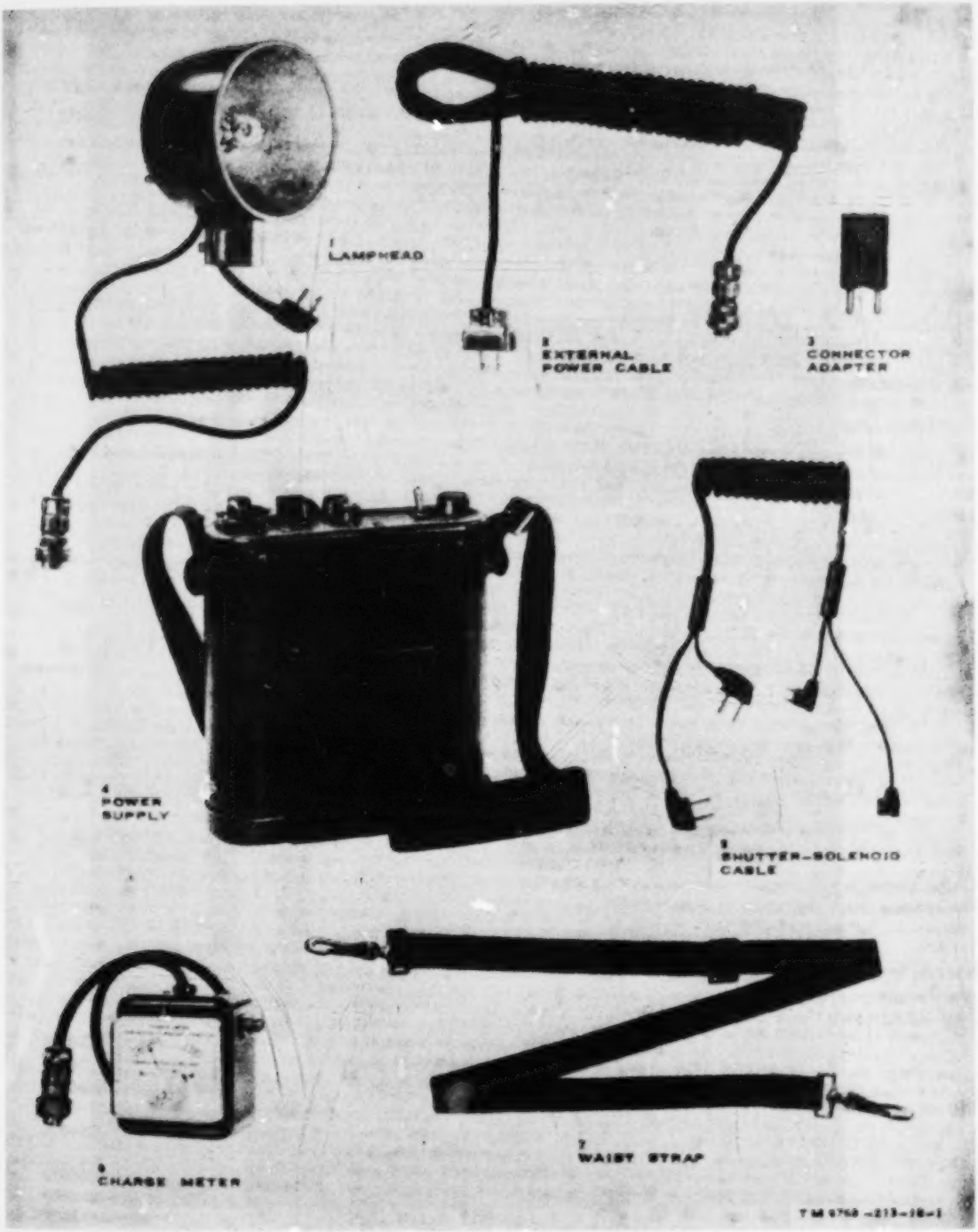

Figure 1-1. Flash Unit, Photographic Repeating LM-33(1), components (less spare parts).

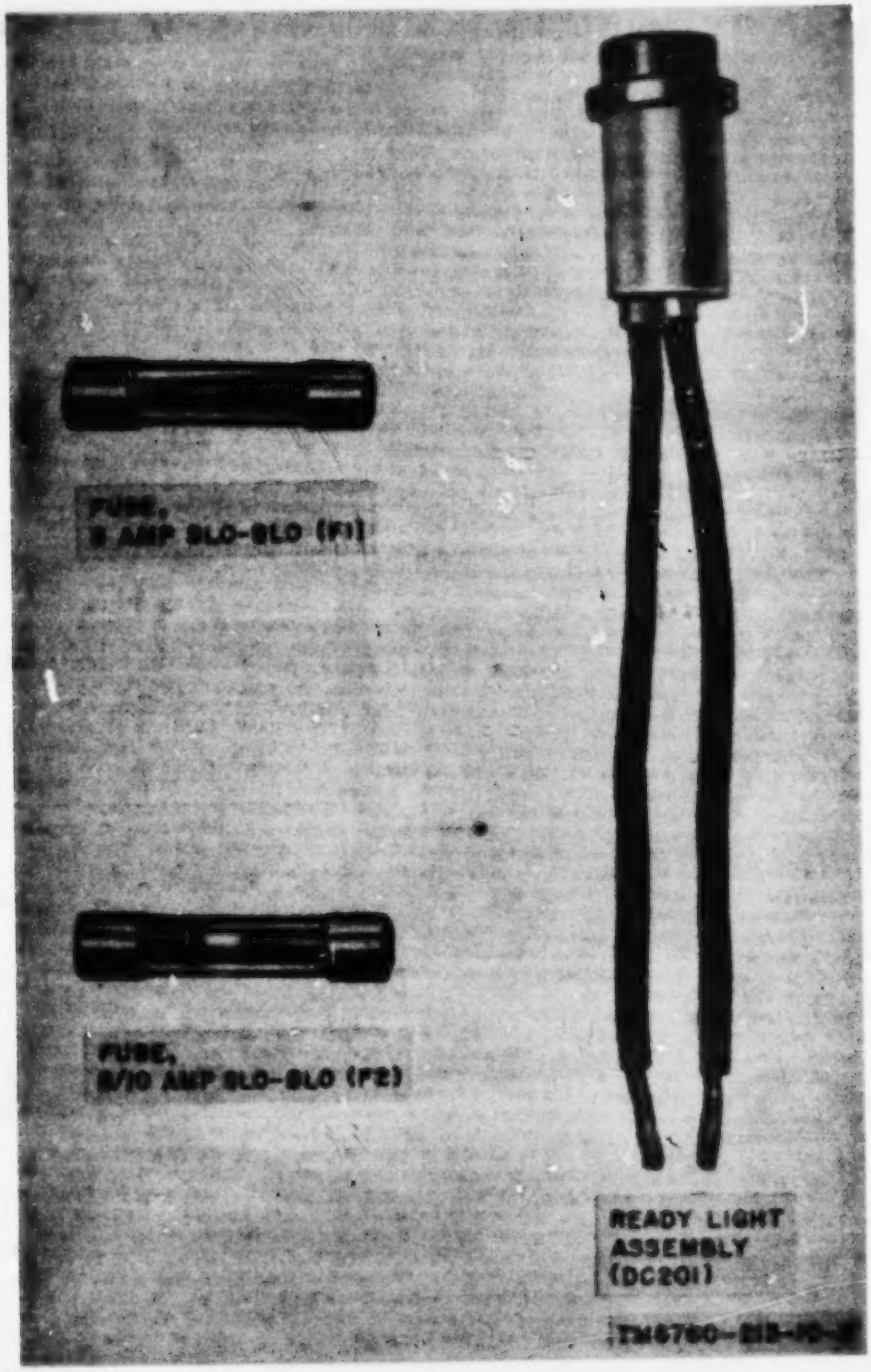

Figure 1-2. Flash Unit, Photographic Repeating LM-33(1), spare parts.

1-6. Table of Components

NOTE

This listing is based on the original shipment by the contractor on order No. AF33(600) 42216.

a. Components and Dimensions (fig. 1-1).

Quantity	Item	Dimensions (in.)			Weight (lb)
		Width	Height	Depth	
1	Power supply	8¾	8¾	2¾	5.63
1	Lamphead, flash unit (lamphead)	5¼		4½	1.44
1	Test set, battery (charge meter)	2 13/16	3 5/16	2 5/16	0.63
1	Cable assembly, electrical, special purpose (shutter-solenoid cable).			20 lg (compressed) 48 lg (extended).	0.43
1	Cable assembly, electrical, special purpose (external power cable).			240 lg	0.75
1	Adapter, connector	1⅛	½	1¾	0.09
1	Belt, retaining, power supply (waist strap).	1		55 lg	0.12
1 set	Spare parts (*b* below).				

Note. Refer to paragraph 1-8 for information on additional equipment required but not supplied.

b. Spare Parts (fig. 1-2).

Quantity	Item
1	Lamp assembly, glow (ready light assembly).
1	Fuse, cartridge, 8-ampere.
1	Fuse, cartridge, 8/10-ampere.

c. Items Comprising an Operable Flash Unit, Photographic Repeating LM-33 (1).

FSN	Qty	Nomenclature, part No., and mfr code
		NOTE The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government Agency, etc.
		NOTE Dry batteries shown are used with the equipment but are not considered part of the equipment. They will not be preshipped automatically but are to be requisitioned in quantities necessary for the particular organization in accordance with SB 11-6.
5935-823-0254	1	Adapter, Connector: DD-533; 90838
6140-777-3322	5	Battery Storage: 5-3L420; 55033
6760-529-5816	1	Cable Assembly, Electrical, Special Purpose: DD-533; 90838
6760-834-2250	1	Cable Assembly, Electrical, Special Purpose: SE-421; 90838
6760-707-8035	1	Lamp Assembly, Glow: 91802
6760-529-5814	1	Lamphead, Flash Unit: 90838; SE-408
6760-738-8236	1	Plate, Switch: Locking 1
6760-827-7942	1	Power, Supply: 90838; SD-196
6625-532-3687	1	Test Set, Battery: SE-407; 90838
6760-827-7942	1	Power, Supply: SD-196; 90838

1-7. Description

Flash Unit, Photographic Repeating LM-33 (1) consists of a power supply, a lamphead, a charge meter, the necessary cables, and accessories.

a. Power Supply. The power supply is an electrical assembly housed in a metal case. The electrical assembly consists of the parts and circuits necessary to operate the lamphead flash tube *(b* below) either from a battery (not supplied with the LM-33(1) or from an external alternating current (ac) source. The case includes a battery compartment with a removable cover. All necessary connectors and operating controls are mounted on the top of the case. A web shoulder strap, with a protective shoulder pad, and an adjustable web waist strap are provided to support the power supply during use.

b. Lamphead. The lamphead consists of a parabolic reflector and a flash tube with its associated electrical parts inclosed in a formed metal housing. A clear plastic window protects the flash tube and reflector. The controls, connector, and indicator lamp (READY LIGHT) are mounted on the rear of the housing and two cables are attached to the unit. A mounting socket with an indexing slot and a locking screw is mounted on the bottom of the housing.

c. Cables and Connector Adapter. Two cable assemblies and a connector adapter are supplied as part of the LM-33(1).

(1) *Shutter-solenoid cable.* The shutter-solenoid cable is a four-conductor, coiled cable with two right-angle connectors at each end. Two miniature connectors at one end connect the cable to the shutter contacts and the solenoid of the camera; two standard parallel blade connectors at the other end connect the cable to the lamphead and to the camera flashgun (flashlamp flasher).

(2) *External power cable.* The external power cable is a two-conductor cable with a female receptacle connector on one end and a standard male parallel blade connector on the other end.

(3) *Connector adapter.* The connector adapter is a molded rubber device that has a standard female parallel blade receptacle at one end and two round pins at the other end. The round pins, which are detachable, have a different diameter at each end and can be unscrewed and reversed to provide either of two different sized ends.

d. Charge Meter. The charge meter is a modified direct current (dc) voltmeter housed in a metal case with a plastic window that protects the meter dial. A spring-loaded, pushbutton-type switch is located on one side of the case. A cable terminated with a cable connector is attached to the unit.

1-8. Additional Equipment Required

For battery operation of the LM-33 (1), a five-cell, nickel-cadmium (alkaline) wet storage battery, rated at 6 volts, 4.7 ampere-hours, is required but is not furnished with the equipment. Battery, storage, Federal stock No. 6140-777-3322, should be obtained concurrently with the LM-33 (1) through normal supply channels.

CHAPTER 2

OPERATING INSTRUCTIONS

Note. Preparation for initial use will be accomplished by organizational maintenance personnel (chap. 4).

Section I. OPERATOR'S CONTROLS, INDICATORS, AND CONNECTORS

2-1. Power Supply Controls and Connectors
(fig. 2-1)

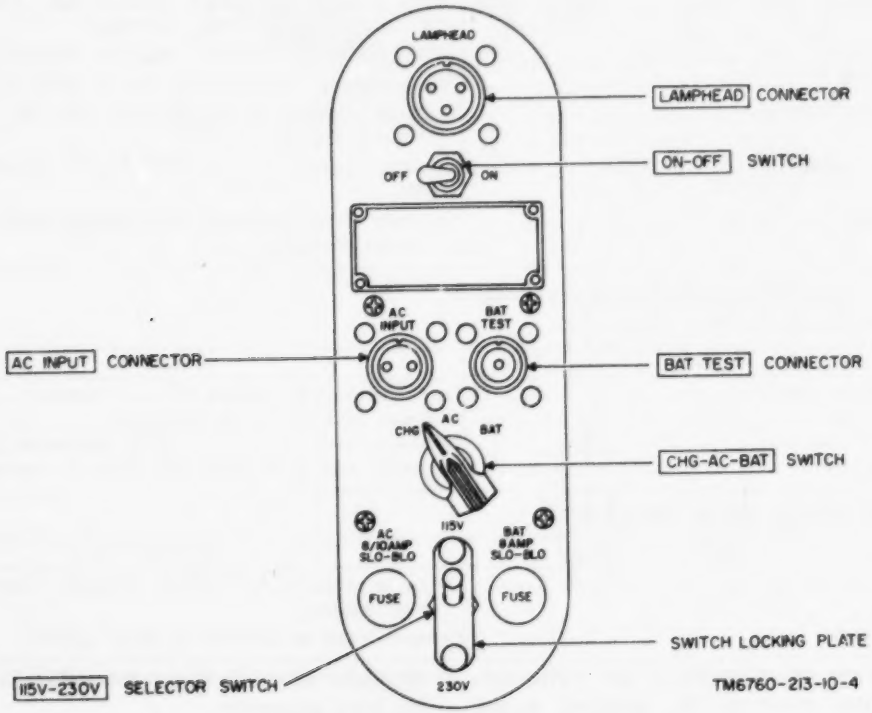

Figure 2-1. Power supply controls and connectors.

Control or connector	Function
115V-230V selector switch	Arranges ac input circuit for operation on 115-volt (115V position) or 230-volt (230V position) ac supply.
Switch locking plate	Prevents accidental movement of the 115V-230V selector switch.
CHG-AC-BAT switch	Arranges the circuits for type of operation desired, as follows:
	Position — *Action*
	CHG — Battery charging.
	BAT — Battery operation.
	AC — Ac operation.

2-1. Power Supply Control and Connectors (fig. 2-1) (Cont.)

Control or connector	Function
ON-OFF switch	Energizes or deenergizes power supply for all types of operation.
AC INPUT connector	Connects external power cable power supply connector (para 2-3b) to power supply.
BAT TEST connector	Connects charge meter cable connector (para 2-4) to power supply.
LAMPHEAD connector	Connects lamphead power connector (para 2-2) to power supply.

2-2. Lamphead Controls, Indicator, and Connectors (fig. 2-2)

Control, indicator, or connector	Function
PUSH TO FLASH switch	When pressed, causes flash tube to flash. Used for test or nonsynchronized flash operation.
POWER switch	Controls intensity of light (FULL or HALF).
READY LIGHT	When flashing, indicates that unit is ready for operation.
Lamphead power connector	Connects lamphead to LAMPHEAD connector (para 2-1) of power supply.
Solenoid power connector	Connects lamphead to BATTERY outlet of camera flashgun.
SYNC receptacle	Connects shutter-solenoid cable sync connector (para 2-3a) to lamphead.

2-3. Cable Connectors and Connector Adapter

a. Shutter-Solenoid Cable (fig. 2-3).

Connector	Function
Shutter connector (red dot)	Connects cable to camera shutter contacts.
Solenoid connector	Connects cable to camera solenoid.
Sync connector (red dot)	Connects cable to lamphead SYNC receptacle (para 2-2).
Flashgun connector	Connects cable to SOLENOID outlet of camera flashgun.

b. External Power Cable (fig. 2-3).

Connector	Function
Power supply connector	Connects cable to AC INPUT connector (para 2-1) of power supply.
AC input connector	Connects cable to external ac power source.

c. Connector Adapter (fig. 1-1). The connector adapter converts the external power cable ac input connector (*b* above) from a standard parallel blade connector to a round pin-type connector.

2-4. Charge Meter Control, Indicator, and Connector (fig. 3-1)

Control, indicator, or connector	Function
Charge meter pointer	When button is pressed, indicates battery charge condition as follows: *Position* — *Indicates* FULL — Battery fully charged. RECHARGE — Battery discharged and requires charging.
Button	When pressed, closes circuit through meter.
Cable connector	Connects charge meter to BAT TEST connector of power supply (para 2-1).

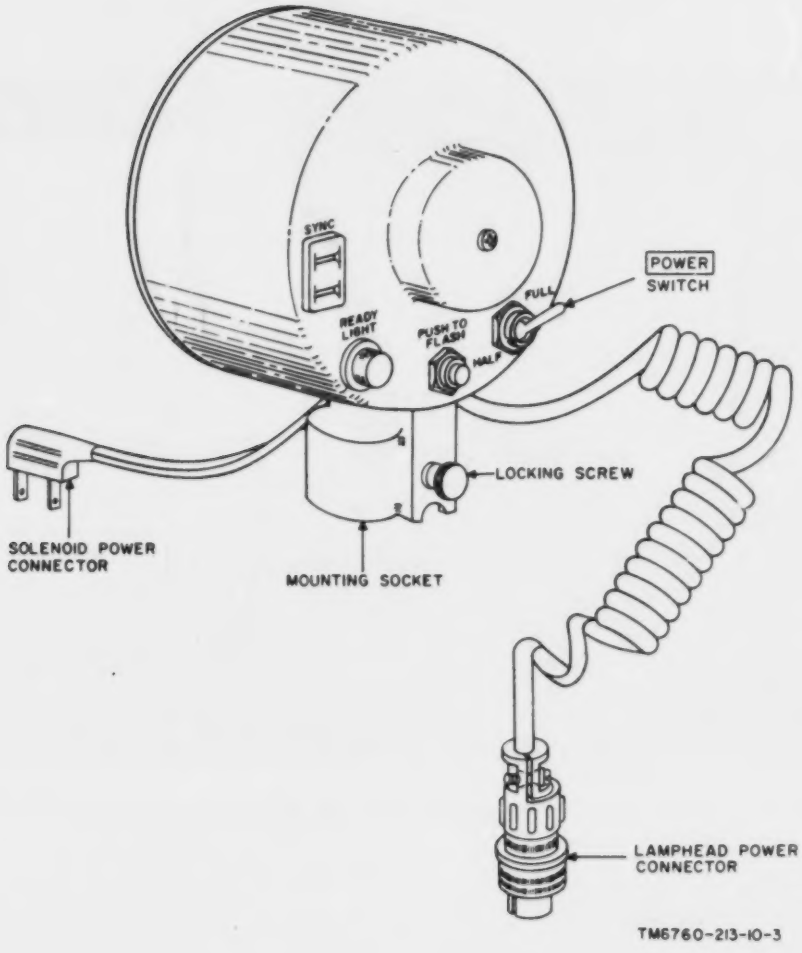

Figure 2-2. Lamphead controls, indicator, connectors, and mounting provisions.

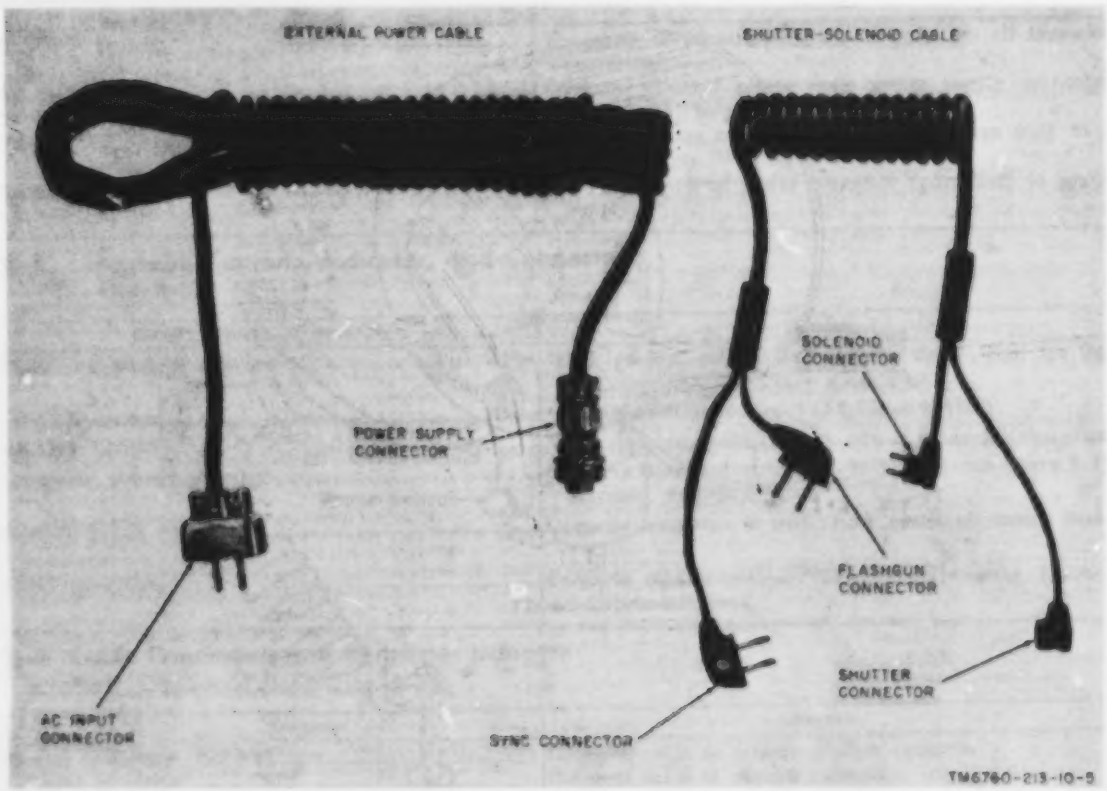

Figure 2-3. Shutter-solenoid cable and external power cable.

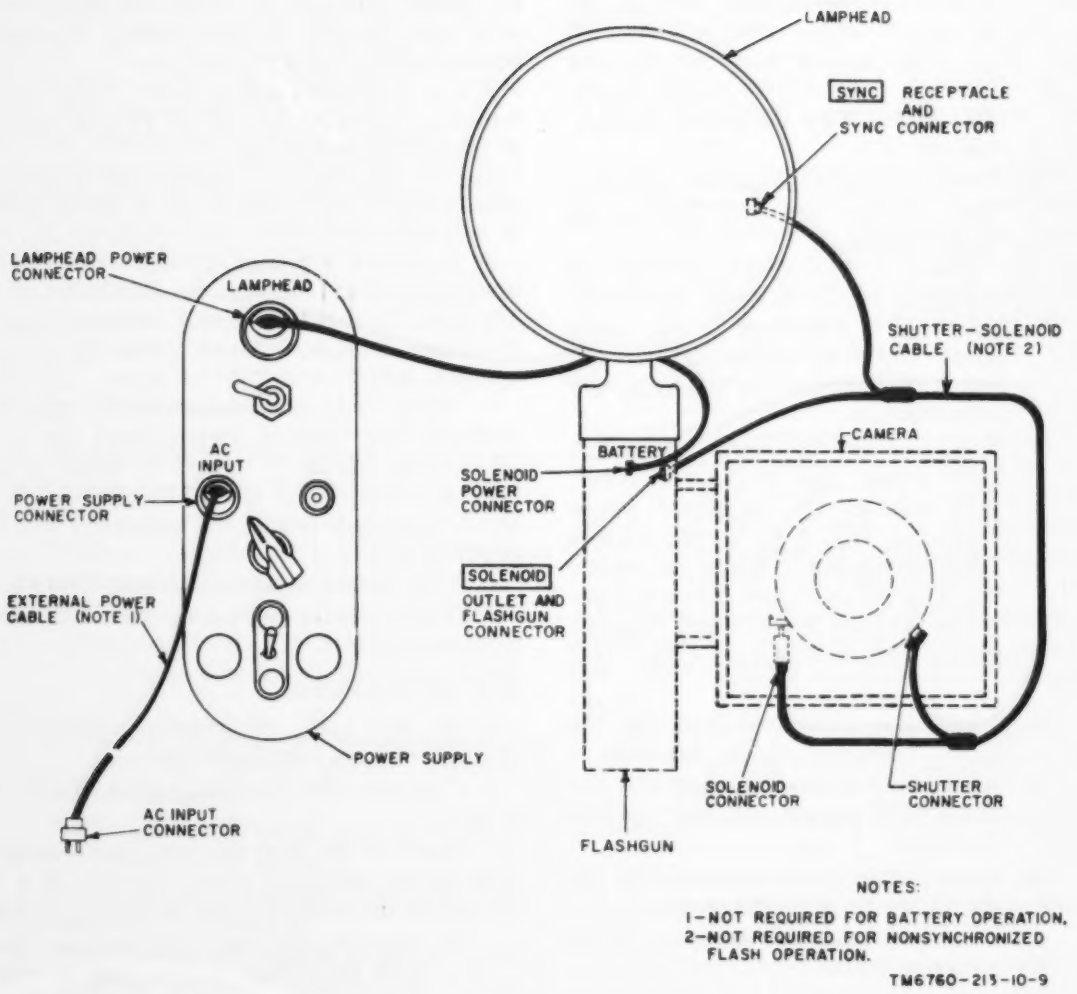

Figure 2-4. Interconnection diagram.

Section II. OPERATION UNDER USUAL CONDITIONS

Note. The instructions in this section are based on the use of the LM-33(1) with Camera Set, Still Picture KS-4A(1). The procedures for using the LM-33(1) with similar camera equipments are essentially the same. Information on the KS-4A(1) is contained in TM 11-2352B.

2-5. Preoperating Procedures

a. Checking Battery. Check the battery charge condition (para 3-8). If the battery is not fully charged (as indicated by the charge meter) and there is insufficient time before operation to recharge it adequately (para 2-9), a fully charged replacement battery must be installed by organizational maintenance personnel.

b. Mounting and Connecting Lamphead (fig. 2-2).

Warning: **Remove the batteries from the flashgun before mounting the lamphead to prevent a dangerous shock hazard.**

(1) Place the lamphead on the camera flashgun. The indexing slot in the mounting socket will position the lamphead on the flashgun. Be sure that the lamphead is seated firmly, then secure it by tightening the locking screw.

(2) Insert the solenoid power connector (fig. 2-4) into the BATTERY outlet of the flashgun.

Caution: **The lamphead must be connected to the flashgun before the lamphead is connected to the power supply to prevent a possible short circuit if the power supply is accidentally energized.**

(3) Make sure that the power supply ON-OFF switch (fig. 2-1) is at OFF; then connect the lamphead power connector (fig. 2-4) to the LAMPHEAD connector of the power supply. Check to see that these connectors are mated properly and fastened securely.

c. Connecting Shutter-Solenoid Cable (fig. 2-4).

(1) Insert the sync connector into the SYNC receptacle of the lamphead.

(2) Insert the flashgun connector into the SOLENOID outlet of the camera flashgun.

(3) Connect the shutter connector to the shutter connector of the camera.

(4) Connect the solenoid connector to the camera solenoid.

2-6. Battery Operation

a. Be sure that all the preoperating procedures (para 2-5) have been performed properly.

b. Place the CHG-AC-BAT switch (fig. 2-1) to BAT.

c. Place the POWER switch (fig. 2-2) to FULL or HALF, depending on the intensity of light required.

d. Place the ON-OFF switch (fig. 2-1) to ON. Wait (about 8 seconds) until the READY LIGHT (fig. 2-2) flashes regularly. When the rate of flash is rapid and steady, the unit is ready for operation.

e. The flash tube will be triggered automatically and will by synchronized (sync) with the camera shutter. After each exposure, wait until the READY LIGHT flashes regularly before making the next exposure.

f. For nonsynchronized (open flash) photography, press the PUSH TO FLASH switch to trigger the flash tube.

Note. For nonsynchronized photography, the shutter-solenoid cable is not needed. It may be left connected or removed, as convenient.

g. If, during operation, greater or less light intensity is required, move the POWER switch (fig. 2-2) to FULL or HALF as appropriate. This may be done without deenergizing the power supply.

h. When there are comparatively long periods of time between flashes, place the ON-OFF switch (fig. 2-1) to OFF to conserve the battery. Return the ON-OFF switch to ON about 10 seconds before the next flash will be required.

i. After operation, place the ON-OFF switch to OFF, and perform the procedures indicated in paragraph 2-8.

2-7. AC Operation

a. Be sure the preoperating procedures (para 2-5) have been performed.

b. Place the CHG-AC-BAT switch (fig. 2-1) to AC.

c. Check to see that the 115V-230V switch is set to the voltage of the ac source. If it is not, adjust the position of the switch as follows:

(1) Remove the two thumbscrews that hold the switch locking plate in position, and remove the locking plate.

(2) Place the switch lever in the position (115V or 230V) that corresponds with the voltage of the ac source.

(3) Replace the switch locking plate, and secure it with the thumbscrews.

Note. The hole in the switch locking plate is located off center so that the locking plate must be reversed end for end when it is replaced after the 115V-230V selector switch position has been changed.

d. Connect the power supply connector (fig. 2-4) of the external power cable to the AC INPUT connector of the power supply. Make sure that these connectors are mated properly and fastened securely.

e. Connect the ac input connector to the ac source receptacle. If the ac receptacle is the round pin-type (european), use the connector adapter (fig. 1–1) to convert the standard parallel blade connector on the external power cable to a round pin-type connector. Round pin-type receptacles are of two different sizes; the connector adapter has removable pins that are a different size at each end so that the pins can be unscrewed and reversed to fit either of the two sizes of round pin receptacles.

f. Ac operation of the LM–33(1) now is the same as battery operation (para 2–6*d* through *i*), except that it is unnecessary to place the ON-OFF switch at OFF when there will be a long period between flashes.

2–8. Post Operating Procedures

a. Be sure the ON-OFF switch (fig. 2–1) is at OFF.

b. Press the PUSH-TO-FLASH switch (fig. 2–2) to discharge the power supply.

c. If the equipment was used for ac operation, disconnect the external power cable (fig. 2–4) from the ac source and from the power supply.

d. Disconnect the shutter-solenoid cable connectors from the camera shutter, solenoid, flashgun, and lamphead.

e. Disconnect the lamphead connectors from the power supply and flashgun.

f. Loosen the locking screw, and remove the lamphead from the flashgun.

g. Check the battery charge condition (para 3–8), and, if necessary, charge the battery (para 2–9).

2–9. Battery Charging

a. General. During battery charging, the cells must be vented ((1) below) and the electrolyte level must not be too high ((2) below).

(1) Some gas is formed during charging, causing the electrolyte to bubble. The bursting bubbles cause the electrolyte to be spattered on the pressure vent plugs. As the spattered electrolyte dries, it leaves a powdery residue on the vent plugs. When enough powdery residue accumulates, the vent hole in the plug is blocked, the gas no longer can escape, and gas pressure builds up in the cell. Enough gas pressure can cause the cell to explode. This condition is more likely to happen if the electrolyte level is too high ((2) below).

(2) The electrolyte level becomes lower as the battery becomes discharged. When the battery is recharged, the electrolyte level returns to the previous height. *No matter how low the electrolyte, do not add distilled water until after the charging has been completed.*

(3) Charging the battery for the LM–33(1) may be performed as a short period of charging to be done between uses (*b* below), as a complete charge (*c* below), and by organizational maintenance as a deep cycle discharge and recharge (para 5–11).

b. Short-Period Charging. Use the following procedures for charging the battery between uses when there is not time for a complete charge.

(1) Place the 115V-230V selector switch to the voltage of the ac power source (para 2–7*c*).

(2) Place the CHG-AC-BAT (fig. 2–1) switch to CHG.

(3) Connect the external power cable to the power supply and to the ac power source (para 2–7*d* and *e*).

(4) Place the ON-OFF switch to ON.

(5) To stop the charging, place the ON-OFF switch to OFF and disconnect the external power cable from the ac power source and from the power supply.

c. Complete Charging. Use the following procedures when a complete charge is required.

(1) Retract the slide fastener on the bottom of the power supply case, and remove the battery compartment cover by sliding the cover downward. Lift out the battery.

(2) Loosen the pressure vent plugs.

(3) Perform the procedures outlined in *b*(1) through (4) above.

(4) After charging approximately 10 hours for a completely discharged battery (less for a partially discharged battery), periodically inspect the electrolyte. A gentle bubbling is normal as the battery becomes charged. If the electrolyte boils violently the charging should be stopped.

Note. If one cell bubbles considerably less than the others, check to be sure the vent hole in the cell vent plug is not clogged.

(5) After charging, place the ON-OFF switch to OFF and check the battery charge condition (para 3-8). The charge meter should indicate that the battery is fully charged; if it does not, place the ON-OFF switch to ON and continue charging until the charge meter indicates that the battery is fully charged. If, however, the battery is not fully charged after 14 hours total charging time, refer the battery to organizational maintenance for deep cycle discharge (para 5-11) and complete recharge.

(6) When charging has been completed, place the ON-OFF switch to OFF and disconnect the external power cable from the ac source and from the power supply.

(7) After charging, allow the battery to stand undisturbed for 1 to 3 hours to permit the electrolyte to stabilize; then check the electrolyte level (para 5-8*c* through *f*).

Section III. OPERATION UNDER UNUSUAL CONDITIONS

2-10. Operation in Arctic Areas

Low temperatures affect the performance of the LM-33(1). At 0° F, (-17.5° C), there will be approximately 50 percent reduction in the intensity of the light output of the flash tube and the recycle time will increase up to twice that required under usual operating conditions. The LM-33(1) may be operated at temperatures below 0° F, (−17.5° C.), but with a further reduction in the intensity of the light output and an additional increase in recycle time. The LM-33(1) may be stored at temperatures down to -50° F, (-45° C.) if the battery is removed and stored in a warm place. If the LM-33(1) has been stored at an extremely low temperature and is to be used in a much warmer temperature, observe the following precautions:

a. Wrap the equipment with water-repellent material, such as plastic, and transfer it to the warmer location approximately 6 hours before it is to be used. Do not unwrap the equipment until it has been kept in the warmer location for the required time, because moisture caused by condensation may form on connectors and switches and make the equipment inoperative, or electrical damage, such as short circuits caused by moisture, may result.

b. Before operating the LM-33(1), wipe all surfaces, particularly on and around all connectors, with a clean, dry cloth to remove any moisture that may have formed.

2-11. Operation in Tropical and Desert Areas

The LM-33(1) may be operated in temperatures up to 125° F, (51° C.). At this temperature, there will be a decrease of about 10 percent in the intensity of the light output of the flash tube. The LM-33(1) may be stored at temperatures up to 150° F, (66° C.) for periods not exceeding 4 hours. When the equipment is used in desert or tropical regions where the heat or relative humidity is high, observe the following precautions:

a. Desert Areas. Before using the equipment, remove all sand and other foreign matter, particularly from the connectors and controls. Clean the plastic window of the lamphead carefully to avoid scratching the plastic. Clean the equipment thoroughly after use, and keep it covered or wrapped when it is not in use.

b. Tropical Areas. Inspect the equipment daily for fungus, mold, mites, and corrosion. Remove all fouling immediately. When the equipment is not in use, operate it periodically and store it in a well-ventilated place or, if possible, in a cabinet containing desiccant.

2-12. Operation in Maritime Areas, in Rain, or at High Altitude

a. Maritime Areas. Immediately after use, wipe all exposed parts with a soft cloth to prevent corrosion caused by salt-laden air or salt water spray. Clean the lamphead window with

a cloth moistened with fresh water, and dry thoroughly. Store the equipment in a protected place, or wrap it in water-repellent material when it is not in use.

b. Rain. Rain can cause the LM-33(1) to become inoperative. This usually is caused by water entering the lamphead at the SYNC receptacle. Such trouble can be avoided or minimized by placing a clear plastic cover over the lamphead. The cover will not impair the efficiency of the equipment. The design of the power supply is such that damage caused by rain is improbable.

c. High Altitude. The LM-33(1) may be operated at altitudes up to 10,000 feet without any significant effect on its performance. It may be transported or stored without any special precautions at altitudes up to 50,000 feet.

CHAPTER 3

OPERATOR'S MAINTENANCE INSTRUCTIONS

3-1. Scope of Operator's Maintenance

The maintenance duties normally performed by the operator are listed in *a* through *d* below.

a. Preventive maintenance (para 3-3, 3-5, and 3-7).

b. Checking battery charge condition (para 3-8).

c. Charging battery (para 2-8).

d. Cleaning (para 3-6).

3-2. Tools, Test Equipment, and Materials Required for Operator's Maintenance

No tools or test equipment, except the charge meter furnished with the equipment, are required to perform operator's maintenance of the LM-33(1). Textile cloth (FSN 8305-267-3015) is required for cleaning the equipment, and distilled (or de-ionized) water is required for maintaining the electrolyte level.

3-3. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 3-5, 3-6, and 3-7 cover routine systematic care and cleaning essential to the proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 3-5 and 3-7) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general condition (physical) and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the *references* column lists paragraphs or publications that contain additional pertinent information. If the defect cannot be remedied by the operator, higher category maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

3-4. Operator's Preventive Maintenance Checks and Services Periods

The LM-33(1) requires preventive maintenance checks and services daily and weekly.

a. Paragraph 3-5 specifies checks and services that must be accomplished daily or at least once each week if the equipment is maintained in a standby condition.

b. Paragraph 3-7 specifies *additional* checks and services that must be performed *once each week.* If the equipment is being maintained in a standby condition, the daily and weekly checks and services should be accomplished once each week at the same time.

3-5. Operator's Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Completeness	Check to see that all items required for operation are available.	App B.
2	Exterior surfaces	Remove dirt and moisture from all exposed surfaces.	Para 3-6.
3	Lamphead	Inspect for burned-out or blackened flash tube and cracked or blackened reflector.	

Sequence No.	Item	Procedure	References
4	Power supply	Check battery charge condition	Para 3-8.
5	Switches	During performance check (sequence No. 7 below), check mechanical action of switches. Action should be positive without looseness or binding. Switch levers and knob should be attached securely; knob should not scrape panel.	
6	Switch locking plate	Check to see that 115V-230V switch locking plate is in place and that both thumbscrews are installed and tightened securely.	
7	Performance	Check performance of equipment (para 2-5 through 2-9). Check for indications of improper performance, such as: *a.* READY LIGHT takes too long to begin flashing or flashes irregularly. *b.* During battery operation, vibrator hum is intermittent or too loud. *c.* Flash tube occasionally fails to flash when triggered. *d.* Camera shutter does not always trip when flash tube flashes.	

3-6. Operator's Cleaning

Caution: **Do not use any abrasive cleaning materials on the plastic windows of the lamphead and the charge meter. Plastic is scratched easily; even dust particles on a dirty cloth can damage the surface.**

Use a soft, clean, lint-free cloth to remove dust, dirt, fingermarks, and moisture. If necessary, use a cloth *slightly* dampened (not wet) with water. If water is used, wipe all surfaces, particularly around the switches and connectors, thoroughly dry. Polish the plastic window of the lamphead carefully.

3-7. Operator's Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Shoulder and waist straps.	*a.* Inspect for fraying, broken stitching, and bent or defective snap catches. *b.* See that strap-attaching brackets are attached securely to power supply.	
2	Lamphead	*a.* Check to see that lamphead window is not scratched excessively. *b.* Look for signs of condensation on reflector surface and inside of window, indicating leakage around window.	
3	Power supply	Inspect outside of power supply, particularly around battery compartment cover, for white, powdery deposits indicating battery leakage.	
4	Hardware	Look for empty holes indicating missing screws or other fastenings.	
5	Cables	Inspect condition of cables and connectors.	

3-8. Checking Battery Charge Condition

a. Be sure that the ON-OFF switch is set to OFF.

b. Connect the charge meter cable connector (fig. 3-1) to the BAT TEST connector of the power supply.

c. Press the button on the side of the charge meter just long enough to take a reading (not longer than 3 seconds).

d. If the charge meter pointer is in the area of the dial marked FULL, the battery is fully charged. If the pointer is in the area of the dial marked RECHARGE or in the unmarked area of the dial, the battery requires charging (para 2-9).

Figure 3-1. Using charge meter to check battery charge conditions.

CHAPTER 4
PREPARATION FOR INITIAL USE

NOTE

The procedures given in this chapter must be performed by organizational maintenance personnel.

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

4-1. Unpacking

(fig. 4-1)

a. Packaging Data. Flash Unit, Photographic Repeating LM-33 (1) is packed in a corrugated fiberboard carton lined with cushioning material. The component parts of the equipment are placed within the lined carton in tight-fitting compartments formed of cushioning material that prevent all movement of the equipment within the carton. Desiccant and a humidity indicator are placed in the carton with the equipment. The carton then is sealed and placed within a second corrugated fiberboard carton with a moisture-vaporproof liner. Finally, the moisture-vaporproof liner and the outer corrugated fiberboard carton are sealed. The LM-33(1), packed for domestic shipment, is 12¾ by 13¾ by 10½ inches, its volume is 1.06 cubic feet, and it weighs 15 pounds.

b. Removing Components.

(1) Slit the tape that seals the outer corrugated fiberboard carton, and fold back the flaps.

(2) Carefully slit open the moisture-vaporproof liner; cut just below the seal.

(3) Remove the inner corrugated fiberboard carton, slit the sealing tape, and fold back the flaps.

(4) Remove and unwrap the component parts of the LM-33(1).

4-2. Checking Unpacked Equipment

a. Check the equipment against the packing list. Report discrepancies in accordance with TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

b. Examine each item carefully for evidence of shipping damage. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3).

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front panel near the nomenclature plate. Enter the MWO number (if any) and any appropriate notations in the equipment manual.

NOTE

Current MWO's applicable to the equipment are listed in DA Pam 310-4.

Section II. PREPARING LM-33(1) FOR INITIAL USE

4-3. Preparing Battery for Installation

A nickel-cadmium storage battery, Federal stock No. 6140-777-3322 (fig. 4-2), is used for battery operation of the LM-33(1). This battery normally is shipped with the proper kind and amount of electrolyte and is a completely discharged condition. The cell filler necks are sealed with shipping plugs. The pressure vent plugs used in the filler necks when the battery is in service are furnished in a cloth bag attached to the battery. Prepare the battery for installation in the power supply as follows:

WARNING

The electrolyte used in nickel-cadmium storage batteries is extremely corrosive. Be very careful not to get electrolyte on the hands. After handling the battery, avoid touching the face or eyes with the hands.

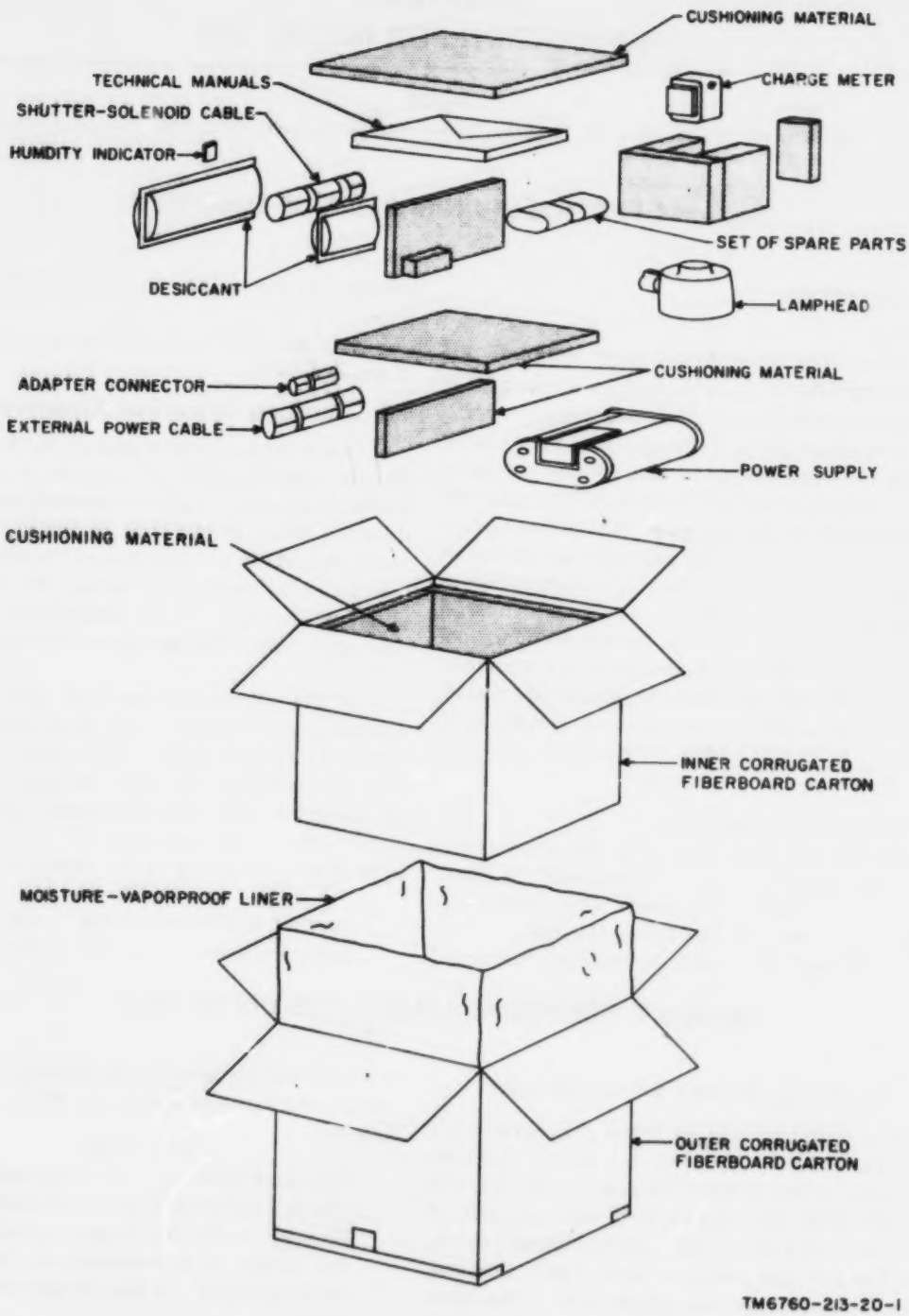

Figure 4-1. Flash Unit, Photographic Repeating LM-33(1), packaging diagram.

Wash the hands thoroughly with soap and water and rinse well with clear water.

a. Detach the bag that contains the pressure vent plugs, and remove the plugs from the bag.

b. Remove the cell filler neck caps.

c. With a screwdriver, remove the shipping plugs and place a pressure vent plug on each cell filler neck. Do not screw in the pressure vent plugs until after the battery is installed and charged (para 4-4*e*).

Caution: **The electrolyte level in a discharged battery may be low. Do not add distilled water until after the battery has been charged.**

d. Reinstall the cell filler neck caps.

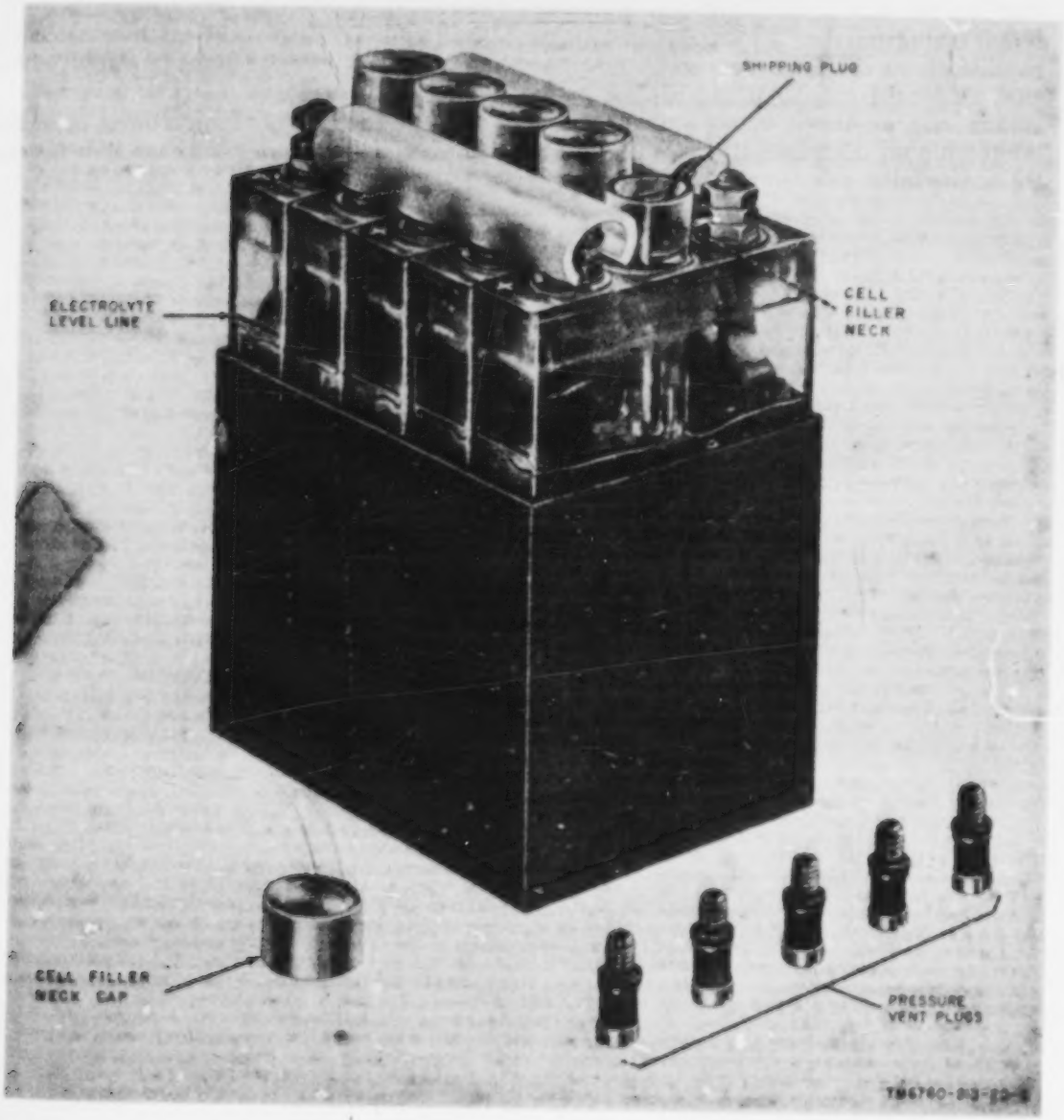

Figure 4-2. Nickel-cadmium storage battery (Federal stock No. 6140-777-3322) used in LM-33(1).

4-4. Installing Battery in Power Supply (fig. 4-3)

a. Set the power supply ON-OFF switch to OFF.

b. Retract the slide fastener (not shown) on the bottom of the power supply case, and remove the battery compartment cover by sliding the cover downward. The battery leads are inside the battery compartment.

c. Remove the top nut from the positive terminal stud (marked +) of the battery. Do not disturb the two lower nuts on the terminal stud. Place the ring lug of the positive (red) battery lead on this terminal stud. Replace the top nut on the terminal stud, and tighten the nut securely.

d. In the same manner (*c* above), connect the negative (black) battery lead to the negative terminal stud (not marked) of the battery.

e. Charge the battery (para 2-9). Carefully screw in the pressure vent plugs. DO NOT OVERTIGHTEN THE PLUGS. Overtightening may result in a broken seal or stripped threads.

f. Place the battery in the battery compartment. Carefully tuck the battery leads into the battery compartment so that the battery compartment cover can be replaced without pinching the leads.

g. Slide the battery compartment cover back into place, and secure it with the slide fastener.

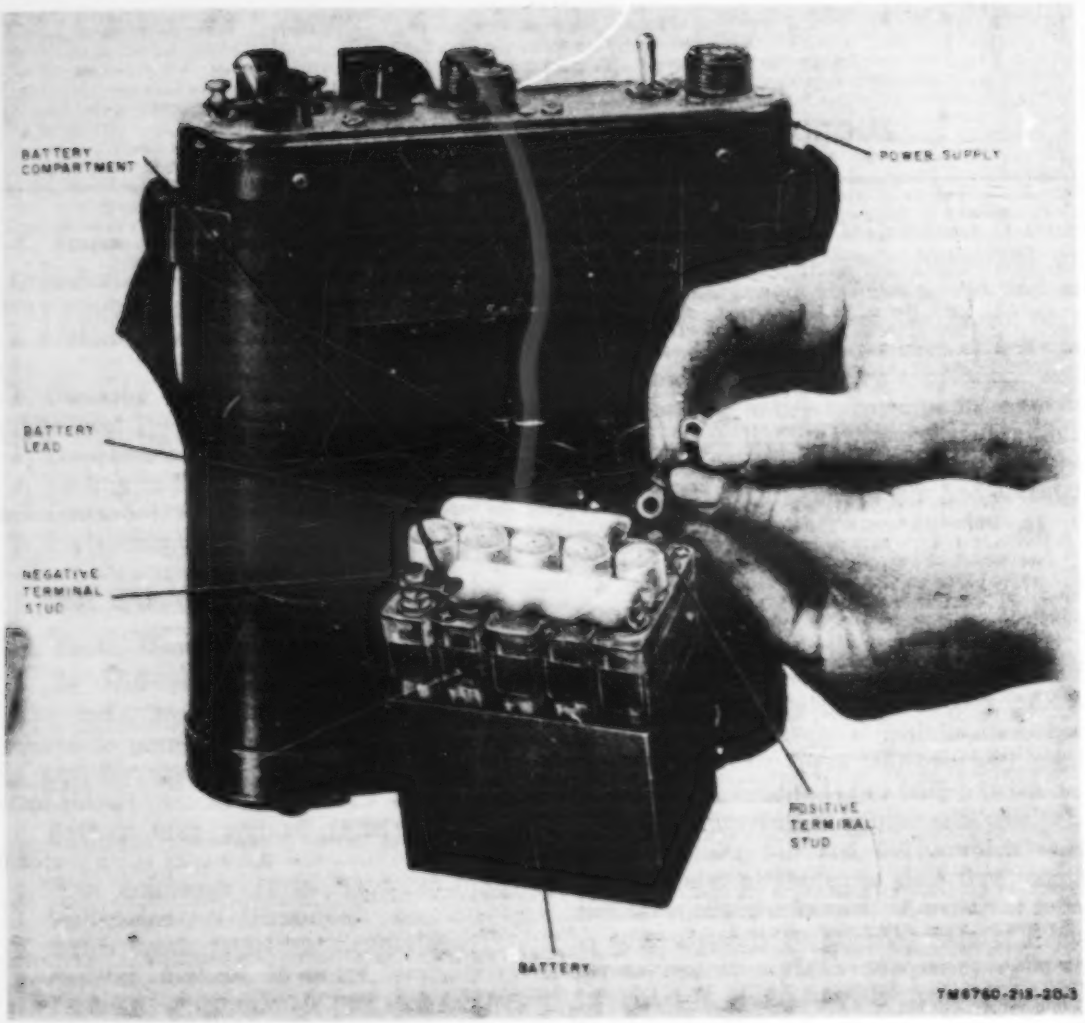

Figure 4-3. Installing battery in power supply.

CHAPTER 5

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

5-1. Scope of Organizational Maintenance

Organizational maintenance of the LM-33(1) consists of the following:

a. Preventive maintenance (para 5-3 through 5-7).

b. Checking and maintaining battery electrolyte level (para 5-8).

c. Troubleshooting (para 5-9 and 5-10).

d. Testing cable continuity and battery voltage (para 5-12).

e. Replacement of authorized parts (para 5-13).

f. Deep cycle discharge (para 5-11).

5-2. Tools, Materials, and Test Equipment for Organizational Maintenance

The tools, materials, and test equipment required to prepare the LM-33(1) for initial use and for organizational maintenance are listed below:

a. Battery filler syringe (FSN 6140-376-9635).

b. Fine sandpaper (FSN 5350-235-0136).

c. Multimeter AN/URM-105.

d. Nylon brush (FSN 7920-680-7929).

e. Resistor, 6 ohms, 25 watts.

f. Tool Kit, Photographic Repairman TK-77/GF.

g. Textile cloth (FSN 8305-267-3015).

5-3. Organizational Preventive Maintenance

a. Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all categories concerned with the equipment and includes inspecting and testing the equipment and the repair or replacement of parts, subassemblies, or units that inspection and tests indicate probably would fail before the next scheduled periodic service. At the organizational category, preventive maintenance checks and services are performed on the LM-33(1) at monthly and quarterly intervals unless otherwise directed by the commanding officer.

b. Maintenance forms and records to be used and maintained are specified in TM 38-750.

5-4. Organizational Monthly Maintenance

Perform the maintenance functions indicated in the monthly preventive maintenance checks and services chart (para 5-5) once each month. Monthly maintenance is in addition to the daily and weekly preventive maintenance checks and services (para 3-5 and 3-7), which should be performed at the same time that monthly maintenance is performed. A month is defined as approximately 30 calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day, monthly preventive maintenance checks and services should be performed at 15-day intervals. The maintenance interval must be adjusted to compensate for any other unusual operating conditions. Equipment maintained in a standby (ready for operation) condition requires monthly maintenance. Equipment in limited storage requires service before operation but does not require monthly maintenance.

5-5. Organizational Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1-W[a]	Battery compartment cover and slide fastener.	*a.* Check to see that battery compartment cover is installed properly and that slide fastener is fastened securely.	

Sequence No.	Item to be inspected	Procedure	References
		b. Inspect slide fastener to see that it is not loose or bent and that it holds battery compartment cover securely in place.	
2	Battery and battery compartment.	Remove battery compartment cover (para 2-9c(1)), and inspect battery compartment.	
		a. Inspect battery for leaks; replace a leaking battery.	a. Para 4-3 and 4-4.
		b. Check electrolyte level when battery is fully charged; if necessary, add distilled water.	b. Para 2-9c (7).
		c. Examine battery and battery compartment for evidence of spewed electrolyte (a white, powdery deposit). If found, remove battery from battery compartment and disconnect leads. Clean battery compartment with damp cloth and cool water, dry thoroughly, and reinstall.	c. None.

*To be accomplished weekly instead of monthly.

5-6. Organizational Quarterly Maintenance

The LM-33(1) requires quarterly preventive maintenance checks and services. Periodic daily services (para 3-5), weekly (para 3-7), and monthly services (para 5-5) constitute a part of the quarterly preventive maintenance checks and services and must be performed concurrently. All deficiencies or shortcomings will be recorded in accordance with the requirements of TM 38-750. Perform all the checks and services listed in the quarterly preventive maintenance checks and services chart (para 5-7) in the sequence indicated.

5-7. Organizational Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Cables and connectors	a. Inspect all cables for cut, broken, or frayed insulation and signs of strain or damage where they enter equipment or attached connectors. Check to see that grommets are in good condition and installed properly.	
		b. Inspect all connectors for loose, broken, or bent pins or blades, corrosion, stripped threads, broken or clogged inserts, and damaged coupling rings. Remove foreign matter from clogged inserts carefully. Remove corrosion with fine sandpaper, and wipe with clean, dry cloth.	
2	Fuses and fuseholders	a. Check to see that there is a fuse of correct type and value in each fuseholder.	a. Para 5-13
		b. Check fuseholders to see that they are installed securely and that fuseholder caps fit tightly.	b. None
3	Hardware	Check to see that all accessible screws, nuts, setscrews, and thumbscrews are installed and properly tightened.	
4	Preservation	Inspect all exterior surfaces for rust, corrosion, and fungus. Remove rust and corrosion, and spot-paint bare areas.	TB SIG 364.
5	Battery	Remove battery compartment cover (para 4-4b), and inspect battery.	

Sequence No.	Item to be inspected	Procedure	References
		a. Check to see that battery leads are connected properly (para 4-4c and d), connections are clean and tight, and battery leads are in good condition.	
		b. Remove cell filler neck caps, and check to see that pressure vent plugs are screwed snugly into place. Clean inside of cell filler necks and cell filler neck caps with clean, damp cloth, dry thoroughly, and replace filler neck caps.	
6	Publications	See that all pertinent publications are available, complete, current, and in serviceable condition.	DA Pam 310-4.
7	Modifications	Check DA Pam 310-4 to determine whether new applicable MWO's have been published. ALL URGENT MWO's must be applied immediately; all NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-4.
8	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. There should be not overstock, and all shortages must be on valid requisition.	App B and D.
9	Battery rejuvenation	Perform deep cycle discharge procedure	Para 5-11.

5-8. Checking and Maintaining Battery Electrolyte Level

Check the battery electrolyte level only after the battery has been fully charged and allowed to stand unused for 1 to 3 hours after charging (para 2-9).

a. Remove the battery compartment cover (para 4-4*b*), and set the power supply on a level surface.

b. Pull the battery forward out of the battery compartment, and place it in front of the power supply. Do not disconnect the battery leads. Be sure the battery is level.

c. Observe the battery electrolyte level. The electrolyte in each cell should be at the electrolyte level line (just covering the plates) marked on the cell (fig. 4-2).

d. If, in any cell (or in all cells), the electrolyte level is *below* the electrolyte level line, add distilled water to bring the liquid up to the line. Proceed as follows:

Caution: **Add only distilled (or de-ionized) water. Never add electrolyte.**

(1) Remove the cell filler neck cap and the pressure vent plug.

(2) Slowly and carefully pour distilled (or de-ionized) water into the cell until the liquid just reaches the electrolyte level line. DO NOT OVERFILL.

(3) Reinstall the pressure vent plug and tighten to a snug fit. Replace the cell filler neck cap.

e. Clean the battery with a stiff nylon brush and a clean cloth. Replace the battery in the power supply, and reinstall the battery compartment cover (para 4-4*f* and *g*).

5-9. Organizational Troubleshooting Procedures

a. Visual Inspection. When the LM-33(1) does not operate properly, inspect it thoroughly for obvious defects, such as the following:

(1) Loose or defective cable, power supply, or lamphead connectors.

(2) Loose, broken, or missing power supply or lamphead controls.

(3) Cracked or broken flash tube or broken flash tube contact pins.

(4) Broken READY LIGHT.

(5) Disconnected or broken battery leads.

(6) Leaking battery.

b. Performance Check. Examine the repair tag to see whether the trouble in the equipment has been sectionalized by the operator during his preventive maintenance or performance checks and what corrective measures, if any, already have been taken.

c. Troubleshooting Chart. Use the troubleshooting chart (para 5-10) to determine the probable cause of the malfunction noted (*b* above) and the remedy required. Only reme-

dies that the organizational maintenance man can apply are given in the chart. If the indicated remedy does not restore normal equipment performance, troubleshooting at higher maintenance categories is required. Note on the repair tag the corrective action that was taken.

d. Tests. Check the external power cable and the shutter-solenoid cable for continuity and shorts (para 5–12*a* and *b*).

5–10. Organizational Troubleshooting Chart

Symptom	Probable cause	Corrective measure
During battery operation, READY LIGHT does not flash and flash tube cannot be flashed.	BAT fuse defective	Check BAT fuse; replace (para 5–13*a*) if defective.
During ac operation, READY LIGHT does not flash and flash tube cannot be flashed.	*a.* AC fuse defective	*a.* Check AC fuse; replace (para 5–13*a*) if defective.
	b. External power cable defective.	*b.* Check external power cable (para 5–12*a*); repair if possible.
During both battery and ac operation, READY LIGHT flashes but camera shutter does not trip and flash tube does not flash.	*a.* Shutter-solenoid cable defective.	*a.* Check shutter-solenoid cable (para 5–12*b*); replace if defective.
	b. Camera or flashgun defective.	*b.* Report to camera maintenance personnel.
During both battery and ac operation, READY LIGHT flashes, camera shutter trips, but flash tube does not flash.	*a.* Shutter-solenoid cable defective.	*a.* Check shutter-solenoid cable conductors terminated by connectors with red dots (para 5–12*b*). If defective, replace shutter-solenoid cable.
	b. Camera defective	*b.* Report to camera maintenance personnel.

5–11. Deep Cycle Discharge Procedure

There is no positive way of measuring the state-of-charge in a nickel-cadmium battery because the voltage does not decrease until the battery is almost completely discharged and the specific gravity of the electrolyte does not change significantly to reflect a charged or discharged condition. The deep cycle discharge procedure may be used when the state-of-charge of a nickel-cadmium battery is not known. Also, when a fully charged battery appears to have a low capacity, the deep cycle discharge procedure may be used to rejuvenate the nickel-cadmium battery. Proceed as follows:

a. Retract the slide fastener on the bottom of the power supply case, and remove the battery compartment cover by sliding the cover downward. Lift out the battery.

b. Remove the top nut from the each of the terminal studs (fig. 4–3); do not disturb the two lower nuts. Remove the battery leads.

c. Connect the 6-ohm resistor (para 5–2) across the positive and negative terminal studs of the battery.

d. Allow the battery to completely discharge. This should take approximately 6 to 8 hours.

e. Remove the resistor from the battery terminals, and measure the voltage with Multimeter AN/URM–105. The AN/URM–105 indication should be less than 4 volts.

f. Reverse the procedures in *a* and *b* above to reinstall the battery.

g. Completely recharge the battery (para 2–9).

5–12. Cable Tests
(fig. 2–3)

To test the cables for continuity and internal shorts, use Multimeter AN/URM–105 (multimeter) and proceed as follows:

a. External Power Cable.

(1) Check the continuity between each terminal of the power supply connector and the corresponding blade of the ac input connector. The multi-

meter should indicate zero resistance at each terminal; if it does not, locate and repair an open circuit in either conductor or between conductor and connector.

(2) Check for short circuits between the blades of the ac input connector. The multimeter should indicate infinite resistance; if it does not, locate and repair a short circuit in the ac input connector, the power supply connector, or at any point between the conductors.

b. Shutter-Solenoid Cable.

(1) Check the continuity between each terminal of the shutter connector and the corresponding blade of the sync connector. These two connectors are identified by red dots. The multimeter should indicate zero resistance at each terminal; if it does not, locate and repair an open circuit in either conductor or between conductor and connector.

(2) Check for short circuits between the blades of the sync connector. The multimeter should indicate infinite resistance; if it does not, locate and repair a short circuit in the sync connector, the shutter connector, or at any point between the conductors.

(3) Check the continuity between each pin of the solenoid connector and the corresponding blade of the flashgun connector. The multimeter should indicate zero resistance at each pin. If it does not, locate and repair an open circuit in either conductor or between conductor and connector.

(4) Check for short circuits between the pins of the solenoid connector. The multimeter should indicate infinite resistance; if it does not, locate and repair a short circuit in the solenoid connector, the flashgun connector, or at any point between the conductors.

5–13. Removal and Replacement of Parts

Note. Parts authorized for stockage for organizational maintenance are listed in appendix D.

a. Fuses. Two fuses are used in the power supply. The replacement procedure ((1) through (5) below) is the same for both fuses. Be sure to use replacement fuses of the correct type and rating as shown in the chart below.

Fuse	Type	Rating (amp)
AC	SLO-BLO	8/10
BAT	SLO-BLO	8

(1) Press down on the fuseholder cap, and twist it in the direction indicated by the arrow until it stops (about one-quarter turn).

(2) Lift the fuseholder cap straight up. The fuse is held in the fuseholder cap by spring clips and will be lifted out of the fuseholder as the fuseholder cap is raised.

(3) Remove the fuse from the fuseholder cap, and insert a new fuse of the proper type and rating.

(4) Carefully insert the fuse into the fuseholder, and turn the fuseholder cap until it drops into place.

(5) Press down on the fuseholder cap, and twist it in a direction opposite to that indicated by the arrow until it stops (about one-quarter turn).

b. CHG-AC-BAT Switch Knob.

(1) Set the CHG-AC-BAT switch to CHG.

(2) Remove the BAT fuseholder cap and fuse (*a*(1) and (2) above).

(3) Loosen the setscrew in the end of the CHG-AC-BAT switch knob, and pull the knob off the shaft.

(4) Place the new knob on the shaft with the pointer end of the knob at the position marked CHG. Tighten the setscrew securely.

(5) Replace the BAT fuse and fuseholder cap (*a*(4) and (5) above).

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

6-1. Preparation for Shipment and Limited Storage

a. Remove the battery from the battery compartment, and disconnect the battery leads. Replace the nuts on the terminal studs of the battery.

b. Wipe out the battery compartment with a damp cloth to remove any dried or spewed electrolyte; then wipe the battery compartment thoroughly dry with a clean, dry cloth.

c. Tuck the battery leads into the battery compartment, and replace the battery compartment cover.

d. Check the equipment to see that all the components of the LM-33(1) (appx B), including the set of spare parts, are present.

6-2. Repackaging for Shipment or Limited Storage

The exact procedure for repackaging the LM-33(1) depends on the materials available and the conditions under which the equipment is to be shipped or stored. Whenever possible, adapt the procedures outlined in *a* and *b* below. The information concerning the original packaging (para 4-1) will also be helpful.

a. Materials Required. The materials required for repackaging the LM-33(1) are listed below. For stock numbers of materials refer to SB 38-100.

(1) Corrugated fiberboard (wrapping and cushioning).
(2) Gummed paper tape.
(3) Waterproof barrier material.
(4) Pressure-sensitive tape.
(5) Cotton twine.
(6) Filler material.
(7) Fiberboard box.

b. Packaging.

(1) Wrap the power supply, the lamphead, the charge meter, and the connector adapter individually in corrugated fiberboard, and seal each with gummed paper tape.
(2) Wrap the set of spare parts together in corrugated fiberboard, and seal with gummed paper tape.
(3) Overwrap each of the corrugated-fiberboard-wrapped packages ((1) and (2) above) with waterproof barrier material, and seal all closures with pressure-sensitive tape.
(4) Coil the external power cable neatly, and tie the coil with cotton twine. Wrap the coiled external power cable and the shutter-solenoid cable separately in waterproof barrier material, and seal all closures with pressure-sensitive tape.
(5) Wrap the technical manuals tightly in waterproof barrier material, and seal all closures with pressure-sensitive tape.
(6) Pack the packaged equipment ((1) through (4) above) in a fiberboard box of appropriate dimensions. Pad all surfaces of the packages with filler material, and fill all voids with filler material to prevent any movement of the equipment within the box. Place the packaged technical manuals on top of the equipment.
(7) Fold down the flaps of the fiberboard box, and seal all seams and closures with pressure-sensitive tape.

Section II. DEMOLITION TO PREVENT ENEMY USE

6-3. Authority for Demolition

Demolition of this equipment will be accomplished only upon the order of the commander. Use the destruction procedures outlined in paragraph 6-4 to prevent further use of the equipment.

6-4. Methods of Destruction

Use any or all of the following demolition procedures to prevent the enemy from using or salvaging the equipment:

a. Smash. Smash the lamphead, charge meter, battery, controls, connectors, and all internal parts of the power supply; use sledges, axes, handaxes, pickaxes, hammers, crowbars, or other heavy tools.

b. Cut. Cut the waist and shoulder straps and all cables and wiring; use axes, handaxes, or machetes.

Warning: **Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.**

c. Burn. Burn the waist and shoulder straps, cables, and technical manuals; use gasoline, kerosene, oil, flamethrowers, or incendiary grenades.

d. Bend. Bend the case and chassis of the power supply.

e. Dispose. Bury or scatter the destroyed parts in slit trenches or foxholes, or throw them into streams.

APPENDIX A

REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders.
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 38-100	Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army.
TB SIG 364	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 11-401	Elements of Signal Photography.
TM 11-2352B	Still Picture Camera Set KS-4A(1).
TM 11-6625-203-12	Operator and Organizational Maintenance: Multimeter AN/URM-105, Including Multimeter ME-77/U.
TM 38-750	Army Equipment Record Procedures.

APPENDIX B
BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL)

Section I. INTRODUCTION

B-1. Scope

This appendix lists only basic issue items required by the crew/operator for installation, operation, and maintenance of Flash Unit, Photographic Repeating LM-33 (1).

B-2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

a. Basic Issue Items List–Section II. A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

b. Items Troop Installed or Authorized List–Section III. Not applicable.

B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* Not applicable.

b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characterisitcs of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

d. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., and is identified in SB 708-42.

e. Description. Indicates the Federal item name and a minimum description required to identify the item.

f. Unit of Measure (U/M). Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, (e.g., ea, in., pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

g. Quantity Furnished with Equipment (Basic Issue items Only). Indicates the quantity of the basic issue item furnished with the equipment.

Section II. BASIC ISSUE ITEMS LIST

(1) Illustration		(2) Federal stock number	(3) Part number	(4) FSCM	(5) Description Usable on code	(6) Unit of meas	(7) Qty furn with equip
(A) Fig. no.	(B) Item no.						
1-1		6760-707-8085	AE-81	90838	BELT, RETAINING, POWER SUPPLY	EA	1

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Flash Unit, Photographic Repeating LM-33(1). It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Explanation of Format for Maintenance Allocation Chart

a. Group Number. Group numbers correspond to the reference designation prefix assigned in accordance with ASA Y32.16, Electrical and Electronics Reference Designations. They indicate the relation of listed items to the next higher assembly.

b. Component Assembly Nomenclature. This column lists the item names of component units, assemblies, and subassemblies, on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Codes	Maintenance category
C	Operator/Crew
O	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by those numbers in section III.

e. Remarks. Self-explanatory.

C-3. Explanation of Format for Tool and Test Equipment Requirements

The columns in the tool and test equipment requirements chart are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number.

e. Tool Number. Not used.

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1	FLASH UNIT, PHOTOGRAPHIC LM-33(1)	C	C	C									1	Visual, clean
			O										2	Battery charge level
			F										3	Continuity of cables
														Check voltage measurements
										O				
										F			5	
											H		5	
										H			6	
1.1	CABLE ASSEMBLY, SPECIAL PURPOSE ELECTRICAL	C							C					Visual
			O							O			2,4	
1.2	LAMPHEAD, FLASH UNIT	C												Visual, clean
										O			4	
										F			3,5	
											H		3,5	
2	TEST SET, BATTERY									F			3,5	
											H		3,5	

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
		LM-33(1) (continued)		
1	C	TEST SET, BATTERY	6625-532-3687	
2	O	MULTIMETER AN/URM-105	6625-581-2036	
3	F	MULTIMETER TS-352/U	6625-242-5023	
4	O	TOOL KIT TK-77	5180-752-9068	
5	F	TOOL KIT TK-109	5180-856-3653	
6	H	AMMETER ME-65/U	6625-752-8817	

APPENDIX D

ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS

Section I. INTRODUCTION

D-1. General

This appendix contains a list of repair parts required for the performance of organizational maintenance for Flash Unit, Photographic Repeating LM-33(1).

Note. No special tools, test, or support equipment are required.

D-2. Explanation of Sections

This repair parts list is divided into sections.

a. Prescribed Load Allowance List (PLA), Section II. The PLA is a consolidated listing of repair parts allocated for initial stockage at organizational maintenance category. This is a mandatory minimum stockage allowance.

b. Repair Parts for Organizational Maintenance, Section III. Repair parts authorized for organizational maintenance is included in this section.

c. Federal Stock Number Cross-Refcrence Index, Section IV. This is a cross reference index of Federal stock numbers to illustrations by figure and item number.

D-3. Explanation of Columns

An explanation of the columns in sections II and III is given below.

a. Source, Maintenance, and Recoverability Codes, Column 1, Section III. Not used.

Note. When no code is indicated in the recoverability column, the part will be considered expendable.

b. Federal Stock Number, Column 1, Section II, Column 2, Section III. The Federal stock number for the item is indicated in this column.

c. Description, Column 2, Section II, Column 3, Section III. The Federal item name, a five digit manufacturer's code and a part number are included in this column.

d. Unit of Issue, Column 4, Section III. The unit used as a basis of issue, e.g., ea, pr, ft, yd, etc is indicated in this column.

e. Quantity Incorporated in Unit Pack, Column 4, Section II, Column 5, Section III. Not used.

f. Quantity Incorporated in Unit, Column 6, Section III. The quantity of repair parts in an assembly is given in this column.

g. Maintenance Allowances, Column 8, Section II, Column 7, Section III.

(1) The allowance columns are divided into subcolumns. Indicated in each subcolumn is the total quantity of items authorized for the number of equipments supported. Items authorized for use as required but not for initial stockage are identified with an asterisk (*) in the allowance column.

(2) The quantitative allowances for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.

(3) Subsequent changes to organizational allowances will be limited as follows: No changes in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-MR-NMP-RS, Fort Monmouth, N. J., 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA

ECOM National Maintenance Point based upon engineering experience, demand data, or TAERS information.

h. Illustration, Column 8, Section III.

(1) *Figure number, column 8a.* The number of the illustration in which the item is shown is indicated in this column.

(2) *Item or symbol number, column 8b.* The callout number used to reference the item in the illustration appears in this column.

D-4. Location of Repair Parts

a. When the Federal stock number is unknown follow the procedures given in (1) through (4) below.

(1) Use the table of contents to locate the appropriate appendix of the repair parts list.

(2) If the item or symbol number is available, locate the item by scrutiny of column 8b of the repair parts list.

(3) If the item, symbol, and figure number is not known check the description column (column 3) in the repair parts list to locate the part.

(4) Locate the applicable illustration in this manual and note the figure number. Use the repair parts listing and locate the figure number and item number as noted on the illustration.

b. When the Federal stock number is known, use the repair part listing to find the part and the figure and item numbers as noted in the Index of Federal stock numbers.

D-5. Federal Supply Codes

This paragraph lists the Federal supply code and the associated manufacturer's name.

Code	Manufacturer
11828	Chesebro-Whitman Co., Inc.
75376	Kurz-Kasch, Inc.
71400	Bussman Mfg. Division of McGraw-Edison Co.
90838	American Speedlight Corp.

Section II. PRESCRIBED LOAD ALLOWANCE LIST

PRESCRIBED LOAD ALLOWANCE						
(i) FEDERAL STOCK NUMBER	(ii) DESCRIPTION	(iii) 15-DAY ORG. MAINT. ALLOWANCE (A) 1-5	(B) 6-20	(C) 21-50	(D) 51-100	(iv) QTY INC IN UN PK
5305-838-7611	THUMBSCREW: 11828; 8-32X3/8	*	2	3	5	
5355-160-6096	KNOB: 75376; S292-1L	*	*	*	2	
5920-199-3968	FUSE, CARTRIDGE: 8/10 amp; 71400; MDL8/10	2	2	3	6	
5920-503-0456	FUSE, CARTRIDGE: 71400; MDL8	2	2	3	6	
5935-518-9653	CONNECTOR, PLUG ELECTRICAL: 90838; MS91184-1	*	*	*	2	
5935-823-0254	ADAPTER, CONNECTOR: 90838; DD-533	*	*	*	2	
6760-529-5816	CABLE ASSEMBLY, ELECTRICAL, SPECIAL PURPOSE: 90838; DD-533	*	*	*	2	
6760-738-8236	PLATE, SWITCH LOCKING: 90838; DE-1026	*	*	*	2	
6760-739-4517	SLING ASSEMBLY, CARRYING, POWER SUPPLY: 90838; AD110	*	*	*	2	

Section III. REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

(1) SOURCE CD (a)	(1) MAINT. CD (b)	(1) REC. CODE (c)	REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE (2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UNIT	(7) IS DAY ORG. MAINT. ALW. 1-5 (a)	6-20 (b)	21-50 (c)	51-100 (d)	(8) ILLUSTRATIONS (a) FIGURE NUMBER	(b) ITEM OR SYMBOL NUMBER
										FLASH UNIT PHOTOGRAPHIC REPEATING LM-33(1)									
			6760-837-5328							FLASH UNIT, PHOTOGRAPHIC REPEATING LM-33(1) (This item is nonexpendable.)								1-1, 1-2	
			5935-823-0254							ADAPTER, CONNECTOR: 90838; DD-533	ea		1	*	*	2	1-1	P-1
			6760-529-5816							CABLE ASSEMBLY, ELECTRICAL, SPECIAL PURPOSE: 90838; DD-533	ea		1	*	*	2	1-1	W-2
			5920-199-3368							FUSE, CARTRIDGE: 8/10 amp; 71400; MDL8/10	ea		1	2	3	6	1-2	F-2
			5920-503-0456							FUSE, CARTRIDGE: 71400; MDL8	ea		1	2	3	6	1-2	F1
			5935-518-9653							CONNECTOR, PLUG ELECTRICAL: 90838; MS91184-1	ea		1	*	*	2	1-1	PN01
			5355-160-6096							KNOB: 75376; 8292-1L	ea		1	*	*	2	D-1	MP-2
			6760-738-8236							PLATE, SWITCH LOCKING: 90838; DE-1028	ea		1	*	*	2	D-1	MP-3
			6760-739-4517							SLING ASSEMBLY, CARRYING, POWER SUPPLY: 90838; AD110	ea		1	*	*	2	1-1	MP-4
			5305-838-7611							THUMBSCREW: 11828; 8-32X3/8	ea		1	*	2	3	D-1	MP-1
			5305-838-7612							THUMBSCREW: 11823; 4-40X3/8	ea		2	*	2	3	D-1	MP-4

Section IV. FEDERAL STOCK NUMBER INDEX

INDEX — FEDERAL STOCK NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE SYMBOL					
STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL	STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL
5305-838-7611	D-1	MP-1			
5305-838-7612	D-1	MP-4			
5355-160-6096	D-1	MP-2			
5920-199-3968	1-2	F-2			
5920-503-0456	1-2	F1			
5935-518-7653	1-1	P401			
5935-823-0254	1-1	P-1			
6760-529-5816	1-1	W-2			
6760-738-8236	D-1	MP-3			
6760-739-4517	1-1	MP-4			

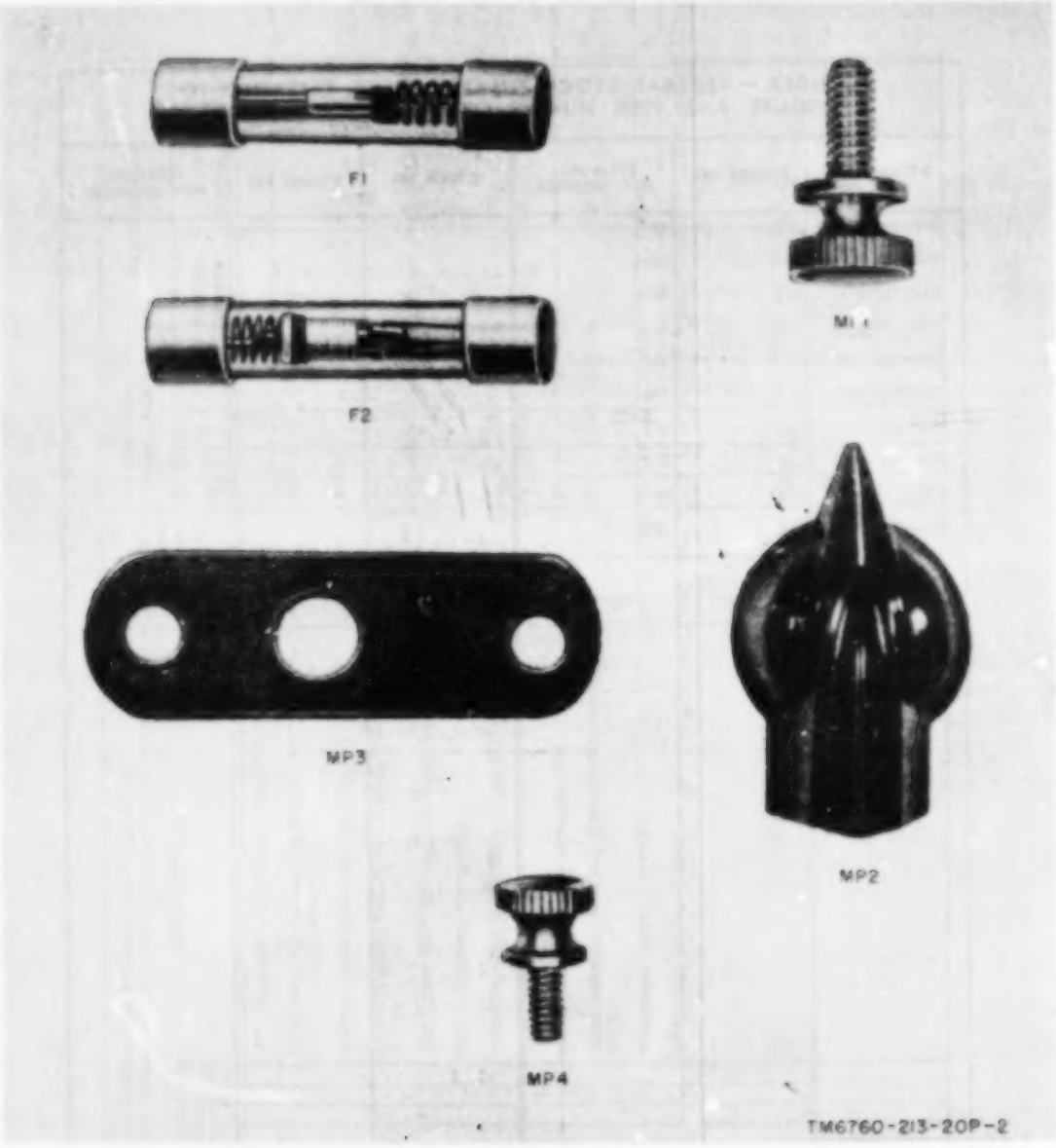

Figure D-1.

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
CNGB (1)
CC-E (7)
Dir of Trans (1)
CofEngrs (1)
TSG (1)
CofSptS (1)
USAARENBD (2)
USACDCEA (1)
USACDCEC (10)
USACDCCBRA (1)
USACDCCEA (1)
USACDCCEA (Ft Huachuca) (1)
USACDCOA (1)
USACDCQMA (1)
USACDCTA (1)
USACDCADA (1)
USACDCARMA (1)
USACDCAVNA (1)
USACDCARTYA (1)
USACDCSWA (1)
USAMC (5)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMD (2)
USAMICOM (4)
USASTRATCOM (4)
USAESC (70)
MDW (1)
Armies (2)
Corps (2)
USAC (3)
Instl (2) except
  Ft Hancock (4)
  Ft Gordon (10)
  Ft Huachuca (10)
  WSMR (5)
  Ft Carson (25)
  Ft Knox (12)
  AV-COMM-CEN (5)
Svc Colleges (2)
USASESCS (5)
USAADS (2)
USAAMS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USATC Armor (2)
USAECFB (2)
USATC Inf (2)
USASTC (2)
Army Dep (2) except
  LBAD (14)
  SAAD (30)
  TOAD (14)
  LEAD (7)
  SHAD (3)
  NAAD (5)
  SVAD (5)
  CHAD (3)
  ATAD (10)
Gen Dep (2)
Sig Sec, Gen Dep (5)
Sig Dep (12)
AMS (1)
WRAMC (1)
Army Pic Cen (2)
USAERDAA (2)
USAERDAW (13)
USACRREL (2)
Sig FLDMS (2)
Units org under fol TOE:—2 ea.
  11-27
  11-57
  11-59
  11-96
  11-117
  11-127
  11-155
  11-157
  11-158
  11-500(AA-AC, FA, FC, FM)
  11-587
  11-592
  11-597
  19-217

NG: State AG (3); units—same as Active Army except allowance is one (1) copy each.
USAR: None.
For example of abbreviations used, see AR 320-50.

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